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NHTSA-03-15715-23

Ford Motor Company

DEPT. OF TRANSPORTATION
DOCKETS

2004 JUL -9 P 12:12

James P. Vondale, Director
Automotive Safety Office
Environmental & Safety Engineering

July 2, 2004

EXECUTIVE SECRETARIAT
2004 JUL -7 A 8:37
NATIONAL HIGHWAY
TRAFFIC SAFETY ADM.

Jeffrey W. Runge, M.D.
Administrator
National Highway Traffic Safety Administration
400 Seventh Street, S.W.
Washington, D.C. 20590

Re: Ford Motor Company Response to NHTSA Request for Comments
Higher Speed Belted Offset Deformable Barrier Test
Docket: NHTSA-2003-15715, FMVSS 208; Occupant Crash Protection, CFR Part 571

Dear Dr. Runge:

Ford Motor Company, a domestic manufacturer and importer of motor vehicles with offices at One American Road, Dearborn, Michigan 48126-2798, whose brands include Ford, Lincoln, Mercury, Volvo, Jaguar, Land Rover, Mazda, and Aston Martin submits the following attached information in response to the agency's Request for Comments on whether to propose a high speed frontal offset crash test requirement. Ford Motor Company has also participated in the development of the comments submitted by the Alliance of Automobile Manufacturers and incorporates those comments by reference.

Ford Motor Company appreciates the agency's request for public comment on this important safety issue. Should you have any questions, please call me at (313) 845-4320.

Sincerely,

James P. Vondale

Attachment

EXECUTIVE SECRETARIAT
2004 JUL -9 P 12:07
NATIONAL HIGHWAY
TRAFFIC SAFETY ADM.

E504-004656

Ford Motor Company Response to NHTSA Request for Comments
CFR Part 571
Docket: NHTSA-2003-15715
FMVSS 208; Occupant Crash Protection

July 2, 2004

I. Executive Summary

NHTSA Rulemaking for Higher Speed Frontal Offset Crash Test Premature

Ford Motor Company (Ford) supports NHTSA's research initiatives to further improve occupant safety during frontal crashes. However, at this time, Ford considers regulatory intervention to introduce a higher speed offset crash test to Federal Motor Vehicle Safety Standard (FMVSS) 208 premature. Ford believes that additional research aimed at understanding potential options for further reducing the risk of injury to the lower extremity during higher-speed offset crashes is needed to ensure that any rulemaking initiative fully considers the wide range of factors that influence real world injury risk. As suggested by NHTSA in its Request for Comments (RFC), countermeasures intended to help reduce the risk of injury to the lower extremity could potentially increase the risk of injury for occupants (including crash-partner occupants) in other crash scenarios such as vehicle-to-vehicle (front-to-front and/or front-to-side) impacts. Ford is constantly faced with these kinds of design challenges. We believe that additional safety research, testing and analysis is needed to better understand these potential safety performance trade-offs.

Ford Analysis of Data from NASS

Ford has conducted an extensive and comprehensive NASS data query in attempting to further understand and evaluate NHTSA's approach to its benefits analysis in the event a higher speed belted offset barrier test were required by regulation. Please see Ford's response to question 1 below for our detailed concerns.

Continuing Safety Advancements

With NHTSA data indicating that thirty-nine percent (39%) of all fatal crashes involve a front-impact, significantly reducing frontal crash fatalities remains a formidable challenge. In response to this challenge, vehicle manufacturers continue to introduce new vehicle and structural designs and advanced occupant protection systems. By advancing vehicle safety designs and technology, improving our roadways, and encouraging US motoring public behavioral changes (e.g., increasing safety belt use and reducing drinking and driving), we may be able to achieve our mutual goal of significantly improving motor vehicle safety.

Determining an Appropriate Vehicle Frontal Crash Test Performance Baseline

Advanced Air Bag Rule - Phase I
The current FMVSS 208 (advanced air bag) standard requires manufacturers to meet a myriad of complex additional test requirements. These new test requirements have significantly reduced the "design space" available to vehicle manufacturers who must consider and apply various new designs and technologies to meet or exceed the new requirements. Vehicle manufacturers are currently phasing-in advanced occupant protection

systems on applicable vehicle models to meet the new requirements. Phase 1 of the newer FMVSS 208 advanced airbag regulation began September 1, 2003, with full compliance required by September 1, 2006. Ford is unaware of any higher-speed offset and compatibility research data published by the agency or anyone else that includes vehicle models designed to fully comply with the new FMVSS 208 advanced air bag standard. To appropriately assess the need for a higher speed offset test, the potential risks and benefits of such a standard, as well as determining and assessing new designs and technologies that may be required, the analysis must use data reflecting performance of vehicles that are certified to meet the new (advanced air bag) FMVSS 208 regulatory requirements. In addition, Ford recommends that NHTSA's higher speed belted offset frontal safety research protocol carry-forward the TEA-21 objectives of enhancing occupant protection while further reducing safety risks that guided development of the requirements in the advanced air bag standard. Until the agency and industry better understand the potential safety trade-offs for the broad range of occupant sizes in the broad range of crash modes, as well as the "design space" available to attempt to address them, regulatory intervention to add a higher speed offset crash test is premature.

Front-to-Front Crash Compatibility Voluntary Agreement & FMVSS 208-Phase 2
In December, 2003, Ford and other vehicle manufacturers committed to meet a voluntary standard for light trucks and multi-purpose vehicles to meet specific geometric requirements for vehicle frontal energy-absorbing crash structures. The phase-in timing for these enhanced geometric compatibility requirements continues through September 1, 2009. During this same period, vehicle manufacturers are phasing in higher speed full frontal FMVSS 208 crash requirements (Advanced Air Bag Rule - Phase 2). Ford suggests that the agency carefully consider the level of regulatory/voluntary standard conformance of higher speed offset research test vehicles so that test result data, when reported, cites a known baseline of conformance to newer requirements, particularly when making direct comparisons between different vehicle models in the fleet. Ford recommends that if the agency were to require, via rulemaking, the addition of a higher speed offset deformable barrier test to FMVSS 208, that the agency would include an implementation (phase-in) timing period that would begin after the Advanced Air Bag Phase 2 period is complete (September 1, 2010).

Crash Safety Research Proposal

In lieu of immediate regulatory intervention, Ford supports an accelerated research program designed to understand the potential effects of adopting the European offset crash standard (ECE R94). Ford supports use of commercially available Thor-Lx or Denton-50M lower legs to facilitate direct comparison of potential benefits/risks of either device. Ford also supports the research use of fully instrumented 5th percentile female, 50th percentile male and other currently FMVSS 208-regulated crash dummies to assess the overall balance of potential benefits/risks given the myriad of complex requirements in the advanced air bag regulation and the potential safety trade-offs resulting from the addition of a higher speed belted barrier crash test.

Limitations of the ECE R94 Barrier Test Protocol

Although Ford supports a research program on ECE R94, Ford believes that the ECE R94 barrier may be inappropriate for testing many vehicle types manufactured for the U.S. market. The ECE fixed deformable offset barrier was developed to replicate vehicle frontal crash structure response of smaller passenger cars, typical in the European market, resulting from vehicle-to-vehicle offset crashes at a higher crash severity. The deformable energy-

absorbing barrier element may not provide realistic resistance when impacted by vehicles of significantly greater mass and front crash structural stiffness.

Ford supports the use of the European offset deformable barrier for compact and subcompact passenger cars, because doing so would harmonize U.S. regulations with those of the rest of the world. If the agency intends to apply offset deformable barrier testing to larger, heaver vehicles, especially light trucks, a deformable element that can absorb added kinetic energy must be developed to provide realistic test results and an accurate indication of vehicle changes that would improve highway safety.

Alliance of Automobile Manufacturers Response

Ford Motor Company participated in the Technical Working Group of the Alliance of Automobile Manufacturers (Alliance) responding to this NHTSA RFC. Ford supports the Alliance response in those sections that are consistent with this Ford response.

II. Response to NHTSA's Questions

1) *Are NHTSA's anticipated safety benefits associated from a fixed offset deformable barrier crash test requirement provided in Section IV realistic? Please provide data to support any views.*

NHTSA's data and analysis produced in the Request for Comments are insufficient for Ford to produce a detailed response. The agency's analysis does not indicate how NHTSA estimated the number of people injured annually in frontal offset crashes, and provides no information on how NHTSA estimated the effectiveness of an offset frontal crash test requirement in reducing these injury counts. The agency needs to provide the public with far more complete analysis that clearly outlines all the steps NHTSA took in developing its estimates of potential safety benefits for an offset frontal crash test requirement. Ford requests that NHTSA provide to the public a detailed description of the SAS code used to produce the subset of crashes categorized as Offset Frontal Crashes.

Ford Analysis of Data from NASS

Ford has conducted an extensive and comprehensive NASS data query in attempting to further understand and evaluate NHTSA's approach to its benefits analysis in the event a higher speed belted offset barrier test were regulated. In doing so, Ford determined that injury estimates from the accident data analysis did not include sufficient detail on the crash selection criteria used to identify crash modes, particularly for frontal offset crashes. The use of selection criteria based on older publications would have included crashes that were inappropriately categorized as offset frontal crashes; as many as 50% of the NASS cases could be inappropriately categorized if the older selection criteria were used. Given the inherent difficulties of crash categorization and the complexities involved in translating a categorization into NASS case selection criteria, Ford would like the opportunity to meet with the agency to discuss and understand the details of the selection criteria as well as discuss future safety data analysis research initiatives and joint research opportunities.

2) *In addition to potential disbenefits to the occupants of collision partners described in this notice, are there other potential disbenefits NHTSA should consider? Please provide data to support any views.*

Yes, there are situations that may present a safety disbenefit. In addition to the information provided in the Ford response to question 1 regarding the NASS data analysis, Ford participated in and incorporates here by reference the Alliance response to question 1.

3) *Is it necessary to stiffen the front corners of vehicles to do well in a fixed offset deformable barrier crash test? Please explain the answer. Also, is the answer to this question different for different vehicle classes? If so, please explain the answer for each vehicle class.*

See the Alliance response to this question.

4) *If stiffening the front corners of vehicles to do well in a fixed offset deformable barrier crash test is just one alternative for improving performance, what other types of countermeasures are available to achieve good performance in a fixed offset deformable barrier crash test? What are the costs and required lead-time associated with these countermeasures?*

See the Alliance response to question 3.

5) *What are the constraints vehicle manufacturers must face in designing a vehicle to meet a high speed fixed offset deformable crash test requirement? Which are the most difficult to overcome? What types of vehicle have the most constraints?*

The advanced airbag regulation creates significant design and performance constraints for a broad range of vehicles. These constraints apply to both passenger cars and light trucks. Until the agency and industry better understand the potential safety trade-offs for the broad range of occupant sizes in the broad range of crash modes, as well as the remaining "design space" available to attempt to address them, regulatory intervention to add a higher speed offset crash test is premature.

6) *Is it necessary for the agency to consider alternative strategies to prevent vehicles from being too stiff or aggressively designed as a result of a fixed offset deformable barrier crash test requirement?*

Yes. A particular research focus should be on determining the appropriate upper limits of test vehicle mass and barrier test impact speed. Ford recommends that the agency undertake further efforts to quantify any safety trade-offs between the primary compatibility attributes of mass, stiffness, and geometry, and possible performance requirements and likely design changes needed to meet a higher speed belted offset crash test. Ford also considers it imperative that the agency assess any occupant safety trade-offs for all size occupants, in both striking and struck vehicles, that would result if a higher speed offset barrier test were added to the currently complex advanced air bag FMVSS 208 requirements. In addition, Ford recommends that the agency consider the development of a progressive deformable barrier (PDB) face as a research initiative leading to a possible longer-term solution. Ford recommends that if the agency were to pursue rulemaking requiring the addition of a higher speed offset deformable barrier test to FMVSS 208, including the possible use of a PDB, the agency's rulemaking would include an implementation (phase-in) timing period that would begin after the Advanced Air Bag Phase 2 period is complete (September 1, 2010).

7) *Are there certain vehicle classes of vehicle weights that should be exempted from a frontal offset crash test requirement? If so, please state the rationale for each vehicle class exemption or vehicle weight limitation.*

Yes, a decision on which vehicle types should be covered by any frontal offset crash test requirement should be determined by a proven safety need for increased protection in such vehicles, while also considering the effects on crash-partner occupant safety.

8) *This notice discussed one potential alternative strategy establishing an additional performance requirement to limit stiffness and/or energy management. Is this an appropriate strategy to pursue? If so, what requirement should be established?*

Yes, it is appropriate to research the option of considering this strategy; however, this approach should be coordinated with current on-going safety research crash compatibility initiatives.

9) *Are there other alternative strategies, beyond those mentioned in this notice, which the agency should consider in conjunction with a fixed offset deformable barrier crash test requirement?*

Ford suggests the agency consider a NHTSA-coordinated research program that includes higher speed belted offset barrier testing and crash compatibility (vehicle-to-vehicle) testing to assess any occupant safety and vehicle safety performance trade-offs. Ford believes that such coordinated research testing may help achieve both enhanced crash compatibility and reduced risk of injury to lower extremities by determining a crash test protocol that balances the benefits and risks of both areas.

10) *What optimum test speed should be employed in the fixed offset deformable barrier test so as to maximize occupant compartment integrity and at the same time ensure no undue stiffening of the fronts of large vehicles? What are the trade-offs between test speed and front-end stiffness of vehicles? Are the countermeasures dependent upon the test speed? If so, please explain the dependence.*

Ford believes it is premature to suggest an "optimum test speed" and that further research is required. Ford considers a potential first step to have the agency continue its evaluation and the implications and any potential safety trade-offs of adding the 35mph European Offset Crash Regulatory (ECE R94) requirement to FMVSS 208, with vehicle class applicability based on demonstrated safety need. Ford suggests that NHTSA next consider a safety research initiative utilizing a fleet-wide modeling approach to determining the appropriate answers to these questions; however, the feasibility of this initiative needs to be studied. Finally, the agency may also want to consider an alternative approach currently under research by JAMA/JARI/Japanese government, in which a vehicle is evaluated given a compartment strength requirement or given a structural deformation requirement without the use of crash test dummies in these vehicle structural evaluations.